

REMARKS

Applicants thank the Examiner for acknowledging the claim for priority under 35 U.S.C. § 119, and receipt of a certified copy of the priority document submitted December 5, 2001.

Applicants thank the Examiner for considering the references cited with the Information Disclosure Statement filed November 13, 2001.

Applicants thank the Examiner for acknowledging the election without traverse of claims 1-8 in the Response to Restriction Requirement filed June 24, 2003.

Status of the Application

Claims 1-8 and 15-17 are all the claims pending in the Application, as claims 15-17 are hereby added to more fully define the current invention, and as claims 9-14 are hereby cancelled without prejudice or disclaimer. Claims 1-8 have been rejected.

Specification Objection

The Examiner has objected to the Title as “not descriptive.” The title is hereby amended as the Examiner has suggested. Thus, withdrawal of this objection is respectfully requested.

Indefiniteness Rejection

The Examiner has rejected claims 3, 4 and 7 as being indefinite under 35 U.S.C. § 112, second paragraph, taking the position that “it is unclear to the Examiner what the foil’s pre-pinch seal dimensions are.”

Claims 3 and 4 recite that “the foil is elongated no more than 15% of the foil’s pre-pinch seal dimension.” Thus, it is clear that the “pre-pinch seal dimension” could be any value, as long as the foil provided in arc tube body “is elongated no more than 15%” of that dimension.

Additionally, Applicants direct the Examiner to the explanatory discussion of the above-recited relationship provided in *at least* paragraph 0016 of the Application, which explains that the elongation of the foil generated by the pinch seal is set to 15% or less in order to effectively suppress the generation of foil tearing.

Thus, Applicants respectfully submit that it is improper for the Examiner to request that Applicants limit the “pre-pinch seal dimension” to any value, and that claims 3 and 4 are clear as filed.

Claim Rejections

The Examiner has rejected claims 1-4 and 8 under 35 U.S.C. § 102(e) as being anticipated by *Horiuchi et al.* (US 6,368,175 B1; hereinafter “*Horiuchi*”), and claims 5-7 under 35 U.S.C. § 103(a) as being unpatentable over *Horiuchi* in view of *Irisawa et al.* (US 5,962,976; hereinafter “*Irisawa*”). These rejections are respectfully traversed.

Horiuchi discloses an arc tube (see FIG. 1) with a spherical light emitting portion 1, sealing portions 2a and 2b, tungsten discharge electrodes 3, molybdenum foil 4, and lead wire 5. Sealing portions 2a and 2b are formed by heating and softening the straight tube portion until it makes contact with the electrode assembly 6 and seals it (see col. 11, lines 5-8, col. 13, lines 41-49, col. 15, lines 6-39). This melting and sealing process provides a residual compressive stress in the quartz glass near the interface with the electrodes of 25 MPa (25,000,000 N/m²) or more. (See col. 8, lines 2-3). *Horiuchi* further discloses that its melting and sealing process is an improvement upon prior art pinch sealing processes (see col. 2, line 25 - col. 3, line 17).

Thus, Applicants respectfully submit that *Horiuchi* does not utilize a pinch-sealing process to form sealing portions 2a and 2b, but rather discloses a different process that improves

upon pinch sealing. Accordingly, *Horiuchi* fail to disclose any particular residual compressive stress in a pinch sealed arc tube.

Irisawa discloses an arc tube (see FIG. 1) with a discharge chamber 3, pinch seals 4, discharge electrodes 8, molybdenum foils 5, and lead wires 9. FIG. 4 shows foil 5 with an irregular surface at interfaces with pinch seals 4.

Independent Claim 1

Regarding claim 1, the Examiner takes the position that FIG. 1 of *Horiuchi* shows all of the features of claim 1, including “molybdenum foil joined with the arc tube body by a pinch seal” (Office Action, numbered paragraph 9).

However, as discussed above, Applicants respectfully submit that sealing portions 2a and 2b of *Horiuchi* are not “pinch seal” portions, and that the disclosed value of residual compressive stress in the quartz glass of 25 MPa is a specific result of *Horiuchi*’s disclosed heating and softening method of forming the sealing portions 2a and 2b, which is not a “pinch seal” process.

Accordingly, Applicants respectfully submit that *Horiuchi* cannot teach or suggest at least “a foil joined with the arc tube body by pinch seal, the arc tube body having a compressive stress of 10^5 N/m² or more along a junction surface with the foil at an ordinary temperature,” as recited in claim 1.

In fact, Applicants respectfully submit that the difference between the processes of the invention and *Horiuchi* are clearly illustrated by the great difference between the residual compressive stress of 25 MPa (25,000,000 N/m²) in sealing portions 2a and 2b of *Horiuchi* and the claimed value of 10^5 N/m² (100,000 N/m²) recited in claim 1.

Dependent Claim 2

Regarding claim 2, the Examiner has taken the position that FIG. 1 of *Horiuchi* discloses the claimed “ratio A/B,” without any further explanation.

However, FIG. 1A of *Horiuchi* is only a dimensionless cross sectional view taken along the length of the arc tube disclosed therein. FIG. 1B only shows the structure of foil 5.

Thus, Applicants respectfully submit that there is no specific teaching or suggestion of any particular dimensions of the pinch seal portions, let alone the claimed ratio, in these Figures (or anywhere else in *Horiuchi*).

Further, as the Examiner seems to possibly be relying on measurements of FIG. 1A itself, Applicants respectfully submit that patent drawings cannot be relied upon for relative dimensions, unless the drawing is specifically indicated as being to scale. See *Hockerson-Halberstadt, Inc. v. Avia Group Int'l*, 222 F.3d 951, 956, USPQ2d 1487, 1491 (Fed. Cir. 2000); MPEP § 2125.

Dependent Claims 5-7

Regarding claims 5-7, the Examiner has taken the position that *Horiuchi* discloses almost all of the features of these claims, except that it does not teach or suggest “a plurality of cracks formed at the junction surface of the foil and the arc tube body, wherein a maximum depth of the cracks is 50% or less of a thickness of the molybdenum foil.” (Office Action, par. 15).

In an attempt to show such a feature, the Examiner cites *Irisawa*, taking the position that it discloses such features in col. 5, lines 3-14. Further, the Examiner alleges that one of skill would have modified *Horiuchi* in view of *Irisawa* to increase “the junction strength of the foil and the arc tube body.”

However, Applicants respectfully submit that one of skill would not have been motivated to modify *Horiuchi* as the Examiner alleges. Specifically, *Horiuchi* discloses a heating and melting process to form seal portions 2a and 2b and provide a residual compressive stress. In contrast, *Irisawa* discloses a pinch seal process to form pinch seals 4. Applicants respectfully submit that these are two different processes, and that one of skill would not have been motivated to modify *Horiuchi* as alleged by the Examiner, as such a modification would have completely changed its disclosed manufacturing process.

Additionally, even if these references could have been combined as the Examiner alleges, Applicants respectfully submit that such a combination would fail to teach or suggest all of the features recited in claims 5-7.

Specifically, Applicants respectfully submit that *Irisawa* fails to teach or suggest any “cracks” in the molybdenum foil 5. In fact, *Irisawa* only discloses that there is an “irregular interface” between the glass and the foil (see col. 5, line 6). This irregular interface fails to teach or suggest the “cracks” recited in claims 5-7.

Further, Applicants respectfully submit that, even if some portion of *Irisawa* could be broadly interpreted as suggesting a “crack,” *Irisawa* fails to teach or suggest any specific relationship between such a feature and the thickness of the foil, as *Irisawa* is silent regarding any specific thickness of the foil 5.

New Claims

Claims 15-17 are hereby added. Claims 15-17 are fully supported *at least* by FIG. 11 of the instant Application. Claims 15-17 are respectfully submitted to be allowable *at least* by virtue of their dependency.


Conclusion

In view of the foregoing, it is respectfully submitted that claims 1-8 and 15-17 are allowable. Thus, it is respectfully submitted that the application now is in condition for allowance with all of the claims 1-8 and 15-17.

- If any points remain in issue which the Examiner feels may be best resolved through a
- personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Please charge any fees which may be required to maintain the pendency of this application, except for the Issue Fee, to our Deposit Account No. 19-4880.

Respectfully submitted,



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